

SEQUENCE LISTING

<110> MOECKEL, Bettina

BATHE, Brigitte

HERMANN, Thomas

PFEFFERLE, Walter

BINDER, Michael

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<151> 2001-02-16

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<170> PatentIn version 3.0

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Ser Trp Leu Ile Gly Thr Pro Glu Trp Arg Ala Arg Gln Lys Glu Glu
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Ser Glu Pro Arg Phe Glu Asp Val Lys Asn Thr Ile Asp Glu Ala Lys
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Glu Lys Asp Ile Asn Tyr Ala Ala Pro Leu Tyr Val Thr Ala Glu Phe
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ctctgagtcg ttgcgttgga attcgtgact ctttttcggt cctgtagcgc	caagaccttg	540
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	1 5	
atc ttg gca gtc tcc cgc cag acc aag tca gtc gtc gat att ccc ggt		764
Ile Leu Ala Val Ser Arg Gln Thr Lys Ser Val Val Asp Ile Pro Gly	10 15 20	
gca ccg cag cgt tat tct ttc gcg aag gtg tcc gca ccc att gag gtg		812
Ala Pro Gln Arg Tyr Ser Phe Ala Lys Val Ser Ala Pro Ile Glu Val	25 30 35	
ccc ggg cta cta gat ctt caa ctg gat tct tac tcc tgg ctg att ggt		860
Pro Gly Leu Leu Asp Leu Gln Leu Asp Ser Tyr Ser Trp Leu Ile Gly	40 45 50	
acg cct gag tgg cgt gct cgt cag aag gaa gaa ttc ggc gag gga gcc		908
Thr Pro Glu Trp Arg Ala Arg Gln Lys Glu Glu Phe Gly Glu Gly Ala	55 60 65	
cgc gta acc agc ggc ctt gag aac att ctc gag gag ctc tcc cca atc		956
Arg Val Thr Ser Gly Leu Glu Asn Ile Leu Glu Glu Leu Ser Pro Ile	70 75 80 85	
cag gat tac tct gga aac atg tcc ctg agc ctt tcg gag cca cgc ttc		1004
Gln Asp Tyr Ser Gly Asn Met Ser Leu Ser Leu Ser Glu Pro Arg Phe	90 95 100	
gaa gac gtc aag aac acc att gac gag gcg aaa gaa aag gac atc aac		1052
Glu Asp Val Lys Asn Thr Ile Asp Glu Ala Lys Glu Lys Asp Ile Asn	105 110 115	
tac gcg gcg cca ctg tat gtg acc gcg gag ttc gtc aac aac acc acc		1100
Tyr Ala Ala Pro Leu Tyr Val Thr Ala Glu Phe Val Asn Asn Thr Thr	120 125 130	
ggt gaa atc aag tct cag act gtc ttc atc ggc gat ttc cca atg atg		1148
Gly Glu Ile Lys Ser Gln Thr Val Phe Ile Gly Asp Phe Pro Met Met	135 140 145	
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Thr Asp Lys Gly Thr Phe Ile Ile Asn Gly Thr Glu Arg Val Val Val	150 155 160 165	
agc cag ctc gtc cgc tcc ccg ggc gtg tac ttt gac cag acc atc gat		1244
Ser Gln Leu Val Arg Ser Pro Gly Val Tyr Phe Asp Gln Thr Ile Asp	170 175 180	
aag tca act gag cgt cca ctg cac gcc gtg aag gtt att cct ttc cgt		1292
Lys Ser Thr Glu Arg Pro Leu His Ala Val Lys Val Ile Pro Phe Arg	185 190 195	
ggt gct tgg ctt gag ttt gac gtc gat aag cgc gat tcg gtt ggt gtt		1340

Gly	Ala	Trp	Leu	Glu	Phe	Asp	Val	Asp	Lys	Arg	Asp	Ser	Val	Gly	Val		
		200					205					210					
cgt	att	gac	cgc	aag	cgt	cgc	cag	cca	gtc	acc	gta	ctg	ctg	aag	gct	1388	
Arg	Ile	Asp	Arg	Lys	Arg	Arg	Gln	Pro	Val	Thr	Val	Leu	Leu	Lys	Ala		
	215					220					225						
ctt	ggc	tgg	acc	act	gag	cag	atc	acc	gag	cgt	ttc	ggg	ttc	tct	gaa	1436	
Leu	Gly	Trp	Thr	Thr	Glu	Gln	Ile	Thr	Glu	Arg	Phe	Gly	Phe	Ser	Glu		
	230				235					240					245		
atc	atg	atg	tcc	acc	ctc	gag	tcc	gat	ggg	gta	gca	aac	acc	gat	gag	1484	
Ile	Met	Met	Ser	Thr	Leu	Glu	Ser	Asp	Gly	Val	Ala	Asn	Thr	Asp	Glu		
				250					255					260			
gca	ttg	ctg	gag	atc	tac	cgc	aag	cag	cgt	cca	ggc	gag	cag	cct	acc	1532	
Ala	Leu	Leu	Glu	Ile	Tyr	Arg	Lys	Gln	Arg	Pro	Gly	Glu	Gln	Pro	Thr		
			265					270						275			
cgc	gac	ctt	gcg	cag	tcc	ctc	ctg	gac	aac	agc	ttc	ttc	cgt	gca	aag	1580	
Arg	Asp	Leu	Ala	Gln	Ser	Leu	Leu	Asp	Asn	Ser	Phe	Phe	Arg	Ala	Lys		
		280					285					290					
cgc	tac	gac	ctg	gct	cgc	gtt	ggg	cgt	tac	aag	atc	aac	cgc	aag	ctc	1628	
Arg	Tyr	Asp	Leu	Ala	Arg	Val	Gly	Arg	Tyr	Lys	Ile	Asn	Arg	Lys	Leu		
	295					300					305						
ggc	ctt	ggg	ggc	gac	cac	gat	ggg	ttg	atg	act	ctt	act	gaa	gag	gac	1676	
Gly	Leu	Gly	Gly	Asp	His	Asp	Gly	Leu	Met	Thr	Leu	Thr	Glu	Glu	Asp		
	310				315					320					325		
atc	gca	acc	acc	atc	gag	tac	ctg	gtg	cgt	ctg	cac	gca	ggg	gag	cgc	1724	
Ile	Ala	Thr	Thr	Ile	Glu	Tyr	Leu	Val	Arg	Leu	His	Ala	Gly	Glu	Arg		
				330					335					340			
gtc	atg	act	tct	cca	aat	ggg	gaa	gag	atc	cca	gtc	gag	acc	gat	gac	1772	
Val	Met	Thr	Ser	Pro	Asn	Gly	Glu	Glu	Ile	Pro	Val	Glu	Thr	Asp	Asp		
			345					350						355			
atc	gac	cac	ttt	ggg	aac	cgt	cgt	ctg	cgt	acc	gtt	ggc	gaa	ctg	atc	1820	
Ile	Asp	His	Phe	Gly	Asn	Arg	Arg	Leu	Arg	Thr	Val	Gly	Glu	Leu	Ile		
		360					365					370					
cag	aac	cag	gtc	cgt	gtc	ggc	ctg	tcc	cgc	atg	gag	cgc	gtt	gtt	cgt	1868	
Gln	Asn	Gln	Val	Arg	Val	Gly	Leu	Ser	Arg	Met	Glu	Arg	Val	Val	Arg		
		375				380						385					
gag	cgt	atg	acc	acc	cag	gat	gcg	gag	tcc	att	act	cct	act	tcc	ttg	1916	
Glu	Arg	Met	Thr	Thr	Gln	Asp	Ala	Glu	Ser	Ile	Thr	Pro	Thr	Ser	Leu		
	390				395					400					405		
atc	aac	gtt	cgt	cct	gtc	tct	gca	gct	atc	cgt	gag	ttc	ttc	gga	act	1964	
Ile	Asn	Val	Arg	Pro	Val	Ser	Ala	Ala	Ile	Arg	Glu	Phe	Phe	Gly	Thr		
				410					415					420			
tcc	cag	ctg	tct	cag	ttc	atg	gtc	cag	aac	aac	tcc	ctg	tct	ggg	ttg	2012	
Ser	Gln	Leu	Ser	Gln	Phe	Met	Val	Gln	Asn	Asn	Ser	Leu	Ser	Gly	Leu		
			425					430						435			
act	cac	aag	cgt	cgt	ctg	tcg	gct	ctg	ggc	ccg	ggg	ggg	ctg	tcc	cgt	2060	
Thr	His	Lys	Arg	Arg	Leu	Ser	Ala	Leu	Gly	Pro	Gly	Gly	Leu	Ser	Arg		
		440					445					450					

gag cgc gcc ggc atc gag gtt cga gac gtt cac cca tct cac tac ggc Glu Arg Ala Gly Ile Glu Val Arg Asp Val His Pro Ser His Tyr Gly 455 460 465	2108
cgt atg tgc cca att gag act ccg gaa ggt cca aac att ggc ctg atc Arg Met Cys Pro Ile Glu Thr Pro Glu Gly Pro Asn Ile Gly Leu Ile 470 475 480 485	2156
ggt tcc ttg gct tcc tat gct cga gtg aac cca ttc ggt ttc att gag Gly Ser Leu Ala Ser Tyr Ala Arg Val Asn Pro Phe Gly Phe Ile Glu 490 495 500	2204
acc cca tac cgt cgc atc atc gac ggc aag ctg acc gac cag att gac Thr Pro Tyr Arg Arg Ile Ile Asp Gly Lys Leu Thr Asp Gln Ile Asp 505 510 515	2252
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acg cac tac gac gaa gag ggc aac atc acc gat gag acc gtc act gtt Thr His Tyr Asp Glu Glu Gly Asn Ile Thr Asp Glu Thr Val Thr Val 535 540 545	2348
cgt ctg aag gac ggc gac atc gcc atg gtt ggc cgc aac gcg gtt gat Arg Leu Lys Asp Gly Asp Ile Ala Met Val Gly Arg Asn Ala Val Asp 550 555 560 565	2396
tac atg gac gtt tcc cct cgt cag atg gtt tct gtt ggt acc gcg atg Tyr Met Asp Val Ser Pro Arg Gln Met Val Ser Val Gly Thr Ala Met 570 575 580	2444
att cca ttc ctg gag cac gac gat gct aac cgt gca ctg atg ggc gcg Ile Pro Phe Leu Glu His Asp Asp Ala Asn Arg Ala Leu Met Gly Ala 585 590 595	2492
aac atg cag aag cag gct gtg cca ctg att cgt gcc gag gct cct ttc Asn Met Gln Lys Gln Ala Val Pro Leu Ile Arg Ala Glu Ala Pro Phe 600 605 610	2540
gtg ggc acc ggt atg gag cag cgc gca gca tac gac gcc ggc gac ctg Val Gly Thr Gly Met Glu Gln Arg Ala Ala Tyr Asp Ala Gly Asp Leu 615 620 625	2588
gtt att acc cca gtc gca ggt gtg gtg gaa aac gtt tca gct gac ttc Val Ile Thr Pro Val Ala Gly Val Val Glu Asn Val Ser Ala Asp Phe 630 635 640 645	2636
atc acc atc atg gct gat gac ggc aag cgc gaa acc tac ctg ctg cgt Ile Thr Ile Met Ala Asp Asp Gly Lys Arg Glu Thr Tyr Leu Leu Arg 650 655 660	2684
aag ttc cag cgc acc aac cag ggc acc agc tac aac cag aag cct ttg Lys Phe Gln Arg Thr Asn Gln Gly Thr Ser Tyr Asn Gln Lys Pro Leu 665 670 675	2732
gtt aac ttg ggc gag cgc gtt gaa gct ggc cag gtt att gct gat ggt Val Asn Leu Gly Glu Arg Val Glu Ala Gly Gln Val Ile Ala Asp Gly 680 685 690	2780
cca ggt acc ttc aat ggt gaa atg tcc ctt ggc cgt aac ctt ctg gtt Pro Gly Thr Phe Asn Gly Glu Met Ser Leu Gly Arg Asn Leu Leu Val	2828

695	700	705	
gcg ttc atg cct tgg gaa ggc cac aac tac gag gat gcg atc atc ctc Ala Phe Met Pro Trp Glu Gly His Asn Tyr Glu Asp Ala Ile Ile Leu 710 715 720 725			2876
aac cag aac atc gtt gag cag gac atc ttg acc tcg atc cac atc gag Asn Gln Asn Ile Val Glu Gln Asp Ile Leu Thr Ser Ile His Ile Glu 730 735 740			2924
gag cac gag atc gat gcc cgc gac act aag ctt ggc gcc gaa gaa atc Glu His Glu Ile Asp Ala Arg Asp Thr Lys Leu Gly Ala Glu Glu Ile 745 750 755			2972
acc cgc gac atc cct aat gtg tct gaa gaa gtc ctc aag gac ctc gac Thr Arg Asp Ile Pro Asn Val Ser Glu Glu Val Leu Lys Asp Leu Asp 760 765 770			3020
gac cgc ggt att gtc cgc atc ggt gct gat gtt cgt gac ggc gac atc Asp Arg Gly Ile Val Arg Ile Gly Ala Asp Val Arg Asp Gly Asp Ile 775 780 785			3068
ctg gtc ggt aag gtc acc cct aag ggc gag acc gag ctc acc ccg gaa Leu Val Gly Lys Val Thr Pro Lys Gly Glu Thr Glu Leu Thr Pro Glu 790 795 800 805			3116
gag cgc ttg ctg cgc gca atc ttc ggt gag aag gcc cgc gaa gtt cgc Glu Arg Leu Leu Arg Ala Ile Phe Gly Glu Lys Ala Arg Glu Val Arg 810 815 820			3164
gat acc tcc atg aag gtg cct cac ggt gag acc ggc aag gtc atc ggc Asp Thr Ser Met Lys Val Pro His Gly Glu Thr Gly Lys Val Ile Gly 825 830 835			3212
ctg cgt cac ttc tcc cgc gag gac gac gac gat ctg gct cct ggc gtc Val Arg His Phe Ser Arg Glu Asp Asp Asp Asp Leu Ala Pro Gly Val 840 845 850			3260
aac gag atg atc cgt atc tac gtt gct cag aag cgt aag atc cag gac Asn Glu Met Ile Arg Ile Tyr Val Ala Gln Lys Arg Lys Ile Gln Asp 855 860 865			3308
ggc gat aag ctc gct ggc cgc cac ggt aac aag ggt gtt gtc ggt aaa Gly Asp Lys Leu Ala Gly Arg His Gly Asn Lys Gly Val Val Gly Lys 870 875 880 885			3356
att ttg cct cag gaa gat atg cca ttc ctt cca gac ggc act cct gtt Ile Leu Pro Gln Glu Asp Met Pro Phe Leu Pro Asp Gly Thr Pro Val 890 895 900			3404
gac atc atc ttg aac acc cac ggt gtt cca cgt cgt atg aac att ggt Asp Ile Ile Leu Asn Thr His Gly Val Pro Arg Arg Met Asn Ile Gly 905 910 915			3452
cag gtt ctt gag acc cac ctt ggc tgg ctg gca tct gct ggt tgg tcc Gln Val Leu Glu Thr His Leu Gly Trp Leu Ala Ser Ala Gly Trp Ser 920 925 930			3500
gtg gat cct gaa gat cct gag aac gct gag ctc gtc aag act ctg cct Val Asp Pro Glu Asp Pro Glu Asn Ala Glu Leu Val Lys Thr Leu Pro 935 940 945			3548

gca gac ctc ctc gag gtt cct gct ggt tcc ttg act gca act cct gtg Ala Asp Leu Leu Glu Val Pro Ala Gly Ser Leu Thr Ala Thr Pro Val 950 955 960 965	3596
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cgt cca aac cgc gac ggc gac gtc atg gtt aac gcg gat ggt aaa gca Arg Pro Asn Arg Asp Gly Asp Val Met Val Asn Ala Asp Gly Lys Ala 985 990 995	3692
acg ctt atc gac ggt cgc tcc ggt gag cct tac ccg tac ccg gtt Thr Leu Ile Asp Gly Arg Ser Gly Glu Pro Tyr Pro Tyr Pro Val 1000 1005 1010	3737
tcc atc ggc tac atg tac atg ctg aag ctg cac cac ctc gtt gac Ser Ile Gly Tyr Met Tyr Met Leu Lys Leu His His Leu Val Asp 1015 1020 1025	3782
gag aag atc cac gca cgt tcc act ggt cct tac tcc atg att acc Glu Lys Ile His Ala Arg Ser Thr Gly Pro Tyr Ser Met Ile Thr 1030 1035 1040	3827
gag cag cca ctg ggt ggt aaa gca cag ttc ggt gga cag cgt ttc Gln Gln Pro Leu Gly Gly Lys Ala Gln Phe Gly Gly Gln Arg Phe 1045 1050 1055	3872
ggc gaa atg gag gtg tgg gca atg cag gca tac ggc gct gcc tac Gly Glu Met Glu Val Trp Ala Met Gln Ala Tyr Gly Ala Ala Tyr 1060 1065 1070	3917
aca ctt cag gag ctg ctg acc atc aag tct gat gac gtg gtt ggc Thr Leu Gln Glu Leu Leu Thr Ile Lys Ser Asp Asp Val Val Gly 1075 1080 1085	3962
cgt gtc aag gtc tac gaa gca att gtg aag ggc gag aac atc ccg Arg Val Lys Val Tyr Glu Ala Ile Val Lys Gly Glu Asn Ile Pro 1090 1095 1100	4007
gat cca ggt att cct gag tcc ttc aag gtt ctc ctc aag gag ctc Asp Pro Gly Ile Pro Glu Ser Phe Lys Val Leu Leu Lys Glu Leu 1105 1110 1115	4052
cag tcc ttg tgc ctg aac gtg gag gtt ctc tcc gca gac ggc act Gln Ser Leu Cys Leu Asn Val Glu Val Leu Ser Ala Asp Gly Thr 1120 1125 1130	4097
cca atg gag ctc gcg ggt gac gac gac gac ttc gat cag gca ggc Pro Met Glu Leu Ala Gly Asp Asp Asp Asp Phe Asp Gln Ala Gly 1135 1140 1145	4142
gcc tca ctt ggc atc aac ctg tcc cgt gac gag cgt tcc gac gcc Ala Ser Leu Gly Ile Asn Leu Ser Arg Asp Glu Arg Ser Asp Ala 1150 1155 1160	4187
gac acc gca tagcagatca gaaaacaacc gctagaaatc aagccataca Asp Thr Ala 1165	4236
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 ccagaacttc gaccttgatg ctg 5099

210> 4

211> 1165

212> PRT

213> Corynebacterium glutamicum

400> 4

Val Leu Glu Gly Leu Ile Leu Ala Val Ser Arg Gln Thr Lys Ser Val
 1 5 10 15

Val Asp Ile Pro Gly Ala Pro Gln Arg Tyr Ser Phe Ala Lys Val Ser
 20 25 30

Ala Pro Ile Glu Val Pro Gly Leu Leu Asp Leu Gln Leu Asp Ser Tyr
 35 40 45

Ser Trp Leu Ile Gly Thr Pro Glu Trp Arg Ala Arg Gln Lys Glu Glu
 50 55 60

Phe Gly Glu Gly Ala Arg Val Thr Ser Gly Leu Glu Asn Ile Leu Glu
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Glu Leu Ser Pro Ile Gln Asp Tyr Ser Gly Asn Met Ser Leu Ser Leu

85

90

95

Ser Glu Pro Arg Phe Glu Asp Val Lys Asn Thr Ile Asp Glu Ala Lys
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Glu Lys Asp Ile Asn Tyr Ala Ala Pro Leu Tyr Val Thr Ala Glu Phe
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Asp Phe Pro Met Met Thr Asp Lys Gly Thr Phe Ile Ile Asn Gly Thr
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Glu Arg Val Val Val Ser Gln Leu Val Arg Ser Pro Gly Val Tyr Phe
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Asp Gln Thr Ile Asp Lys Ser Thr Glu Arg Pro Leu His Ala Val Lys
 180 185 190

Val Ile Pro Phe Arg Gly Ala Trp Leu Glu Phe Asp Val Asp Lys Arg
 195 200 205

Asp Ser Val Gly Val Arg Ile Asp Arg Lys Arg Arg Gln Pro Val Thr
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Val Leu Leu Lys Ala Leu Gly Trp Thr Thr Glu Gln Ile Thr Glu Arg
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Phe Gly Phe Ser Glu Ile Met Met Ser Thr Leu Glu Ser Asp Gly Val
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Phe Phe Arg Ala Lys Arg Tyr Asp Leu Ala Arg Val Gly Arg Tyr Lys
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Ile Asn Arg Lys Leu Gly Leu Gly Gly Asp His Asp Gly Leu Met Thr
 305 310 315 320

Leu Thr Glu Glu Asp Ile Ala Thr Thr Ile Glu Tyr Leu Val Arg Leu
 325 330 335

His Ala Gly Glu Arg Val Met Thr Ser Pro Asn Gly Glu Glu Ile Pro
 340 345 350
 Val Glu Thr Asp Asp Ile Asp His Phe Gly Asn Arg Arg Leu Arg Thr
 355 360 365
 Val Gly Glu Leu Ile Gln Asn Gln Val Arg Val Gly Leu Ser Arg Met
 370 375 380
 Glu Arg Val Val Arg Glu Arg Met Thr Thr Gln Asp Ala Glu Ser Ile
 385 390 395 400
 Thr Pro Thr Ser Leu Ile Asn Val Arg Pro Val Ser Ala Ala Ile Arg
 405 410 415
 Glu Phe Phe Gly Thr Ser Gln Leu Ser Gln Phe Met Val Gln Asn Asn
 420 425 430
 Ser Leu Ser Gly Leu Thr His Lys Arg Arg Leu Ser Ala Leu Gly Pro
 435 440 445
 Gly Gly Leu Ser Arg Glu Arg Ala Gly Ile Glu Val Arg Asp Val His
 450 455 460
 Pro Ser His Tyr Gly Arg Met Cys Pro Ile Glu Thr Pro Glu Gly Pro
 465 470 475 480
 Asn Ile Gly Leu Ile Gly Ser Leu Ala Ser Tyr Ala Arg Val Asn Pro
 485 490 495
 Phe Gly Phe Ile Glu Thr Pro Tyr Arg Arg Ile Ile Asp Gly Lys Leu
 500 505 510
 Thr Asp Gln Ile Asp Tyr Leu Thr Ala Asp Glu Glu Asp Arg Phe Val
 515 520 525
 Val Ala Gln Ala Asn Thr His Tyr Asp Glu Glu Gly Asn Ile Thr Asp
 530 535 540
 Glu Thr Val Thr Val Arg Leu Lys Asp Gly Asp Ile Ala Met Val Gly
 545 550 555 560
 Arg Asn Ala Val Asp Tyr Met Asp Val Ser Pro Arg Gln Met Val Ser
 565 570 575
 Val Gly Thr Ala Met Ile Pro Phe Leu Glu His Asp Asp Ala Asn Arg
 580 585 590

Ala Leu Met Gly Ala Asn Met Gln Lys Gln Ala Val Pro Leu Ile Arg
595 600 605

Ala Glu Ala Pro Phe Val Gly Thr Gly Met Glu Gln Arg Ala Ala Tyr
610 615 620

Asp Ala Gly Asp Leu Val Ile Thr Pro Val Ala Gly Val Val Glu Asn
625 630 635 640

Val Ser Ala Asp Phe Ile Thr Ile Met Ala Asp Asp Gly Lys Arg Glu
645 650 655

Thr Tyr Leu Leu Arg Lys Phe Gln Arg Thr Asn Gln Gly Thr Ser Tyr
660 665 670

Asn Gln Lys Pro Leu Val Asn Leu Gly Glu Arg Val Glu Ala Gly Gln
675 680 685

Val Ile Ala Asp Gly Pro Gly Thr Phe Asn Gly Glu Met Ser Leu Gly
690 695 700

Arg Asn Leu Leu Val Ala Phe Met Pro Trp Glu Gly His Asn Tyr Glu
705 710 715 720

Asp Ala Ile Ile Leu Asn Gln Asn Ile Val Glu Gln Asp Ile Leu Thr
725 730 735

Ser Ile His Ile Glu Glu His Glu Ile Asp Ala Arg Asp Thr Lys Leu
740 745 750

Gly Ala Glu Glu Ile Thr Arg Asp Ile Pro Asn Val Ser Glu Glu Val
755 760 765

Leu Lys Asp Leu Asp Asp Arg Gly Ile Val Arg Ile Gly Ala Asp Val
770 775 780

Arg Asp Gly Asp Ile Leu Val Gly Lys Val Thr Pro Lys Gly Glu Thr
785 790 795 800

Glu Leu Thr Pro Glu Glu Arg Leu Leu Arg Ala Ile Phe Gly Glu Lys
805 810 815

Ala Arg Glu Val Arg Asp Thr Ser Met Lys Val Pro His Gly Glu Thr
820 825 830

Gly Lys Val Ile Gly Val Arg His Phe Ser Arg Glu Asp Asp Asp Asp

835

840

845

Leu Ala Pro Gly Val Asn Glu Met Ile Arg Ile Tyr Val Ala Gln Lys
 850 855 860

Arg Lys Ile Gln Asp Gly Asp Lys Leu Ala Gly Arg His Gly Asn Lys
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Gly Val Val Gly Lys Ile Leu Pro Gln Glu Asp Met Pro Phe Leu Pro
 885 890 895

Asp Gly Thr Pro Val Asp Ile Ile Leu Asn Thr His Gly Val Pro Arg
 900 905 910

Arg Met Asn Ile Gly Gln Val Leu Glu Thr His Leu Gly Trp Leu Ala
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Ser Ala Gly Trp Ser Val Asp Pro Glu Asp Pro Glu Asn Ala Glu Leu
 930 935 940

Val Lys Thr Leu Pro Ala Asp Leu Leu Glu Val Pro Ala Gly Ser Leu
 945 950 955 960

Thr Ala Thr Pro Val Phe Asp Gly Ala Ser Asn Glu Glu Leu Ala Gly
 965 970 975

Leu Leu Ala Asn Ser Arg Pro Asn Arg Asp Gly Asp Val Met Val Asn
 980 985 990

Ala Asp Gly Lys Ala Thr Leu Ile Asp Gly Arg Ser Gly Glu Pro Tyr
 995 1000 1005

Pro Tyr Pro Val Ser Ile Gly Tyr Met Tyr Met Leu Lys Leu His
 1010 1015 1020

His Leu Val Asp Glu Lys Ile His Ala Arg Ser Thr Gly Pro Tyr
 1025 1030 1035

Ser Met Ile Thr Gln Gln Pro Leu Gly Gly Lys Ala Gln Phe Gly
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Gly Gln Arg Phe Gly Glu Met Glu Val Trp Ala Met Gln Ala Tyr
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Gly Ala Ala Tyr Thr Leu Gln Glu Leu Leu Thr Ile Lys Ser Asp
 1070 1075 1080

Asp Val Val Gly Arg Val Lys Val Tyr Glu Ala Ile Val Lys Gly
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 Glu Asn Ile Pro Asp Pro Gly Ile Pro Glu Ser Phe Lys Val Leu
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 Leu Lys Glu Leu Gln Ser Leu Cys Leu Asn Val Glu Val Leu Ser
 1115 1120 1125
 Ala Asp Gly Thr Pro Met Glu Leu Ala Gly Asp Asp Asp Asp Phe
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 Asp Gln Ala Gly Ala Ser Leu Gly Ile Asn Leu Ser Arg Asp Glu
 1145 1150 1155
 Arg Ser Asp Ala Asp Thr Ala
 1160 1165

4210> 5
 4211> 5099
 4212> DNA
 4213> Corynebacterium glutamicum
 4220>
 4221> CDS
 4222> (702)..(4196)

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 tcgacgcctc cctcgacgat gcagctgtct ctaagctggg tgcacaggcc gaaagcatcc 180
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Val Leu Glu Gly Pro	
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Ile Leu Ala Val Ser Arg Gln Thr Lys Ser Val Val Asp Ile Pro Gly	
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Ala Pro Gln Arg Tyr Ser Phe Ala Lys Val Ser Ala Pro Ile Glu Val	
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Pro Gly Leu Leu Asp Leu Gln Leu Asp Ser Tyr Ser Trp Leu Ile Gly	
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Thr Pro Glu Trp Arg Ala Arg Gln Lys Glu Glu Phe Gly Glu Gly Ala	
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Arg Val Thr Ser Gly Leu Glu Asn Ile Leu Glu Glu Leu Ser Pro Ile	
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Gln Asp Tyr Ser Gly Asn Met Ser Leu Ser Leu Ser Glu Pro Arg Phe	
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Glu Asp Val Lys Asn Thr Ile Asp Glu Ala Lys Glu Lys Asp Ile Asn	
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Lys Ser Thr Glu Arg Pro Leu His Ala Val Lys Val Ile Pro Ser Arg	
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Gly Ala Trp Leu Glu Phe Asp Val Asp Lys Arg Asp Ser Val Gly Val	
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Arg Ile Asp Arg Lys Arg Arg Gln Pro Val Thr Val Leu Leu Lys Ala	
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Thr Pro Tyr Arg Arg Ile Ile Asp Gly Lys Leu Thr Asp Gln Ile Asp				
505		510	515	
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Tyr Leu Thr Ala Asp Glu Glu Asp Arg Phe Val Val Ala Gln Ala Asn				
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Thr His Tyr Asp Glu Glu Gly Asn Ile Thr Asp Glu Thr Val Thr Val				
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Arg Leu Lys Asp Gly Asp Ile Ala Met Val Gly Arg Asn Ala Val Asp				
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Tyr Met Asp Val Ser Pro Arg Gln Met Val Ser Val Gly Thr Ala Met				
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Ile Pro Phe Leu Glu His Asp Asp Ala Asn Arg Ala Leu Met Gly Ala				
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Asn Met Gln Lys Gln Ala Val Pro Leu Ile Arg Ala Glu Ala Pro Phe				
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Val Ile Thr Pro Val Ala Gly Val Val Glu Asn Val Ser Ala Asp Phe				
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Ile Thr Ile Met Ala Asp Asp Gly Lys Arg Glu Thr Tyr Leu Leu Arg				
650		655	660	
aag ttc cag cgc acc aac cag ggc acc agc tac aac cag aag cct ttg				2732
Lys Phe Gln Arg Thr Asn Gln Gly Thr Ser Tyr Asn Gln Lys Pro Leu				
665		670	675	
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Val Asn Leu Gly Glu Arg Val Glu Ala Gly Gln Val Ile Ala Asp Gly				
680		685	690	
cca ggt acc ttc aat ggt gaa atg tcc ctt ggc cgt aac ctt ctg gtt				2828
Pro Gly Thr Phe Asn Gly Glu Met Ser Leu Gly Arg Asn Leu Leu Val				
695		700	705	
gcg ttc atg cct tgg gaa ggc cac aac tac gag gat gcg atc atc ctc				2876
Ala Phe Met Pro Trp Glu Gly His Asn Tyr Glu Asp Ala Ile Ile Leu				
710		715	720	725

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gag cac gag atc gat gcc cgc gac act aag ctt ggc gcc gaa gaa atc Glu His Glu Ile Asp Ala Arg Asp Thr Lys Leu Gly Ala Glu Glu Ile 745 750 755	2972
acc cgc gac atc cct aat gtg tct gaa gaa gtc ctc aag gac ctc gac Thr Arg Asp Ile Pro Asn Val Ser Glu Glu Val Leu Lys Asp Leu Asp 760 765 770	3020
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gtg gat cct gaa gat cct gag aac gct gag ctc gtc aag act ctg cct Val Asp Pro Glu Asp Pro Glu Asn Ala Glu Leu Val Lys Thr Leu Pro 935 940 945	3548
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K211> 1165

K212> PRT

K213> *Corynebacterium glutamicum*

K400> 6

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Ser Trp Leu Ile Gly Thr Pro Glu Trp Arg Ala Arg Gln Lys Glu Glu
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Phe Gly Glu Gly Ala Arg Val Thr Ser Gly Leu Glu Asn Ile Leu Glu
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Glu Leu Ser Pro Ile Gln Asp Tyr Ser Gly Asn Met Ser Leu Ser Leu
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Ser Glu Pro Arg Phe Glu Asp Val Lys Asn Thr Ile Asp Glu Ala Lys
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Glu Lys Asp Ile Asn Tyr Ala Ala Pro Leu Tyr Val Thr Ala Glu Phe
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Phe Gly Phe Ile Glu Thr Pro Tyr Arg Arg Ile Ile Asp Gly Lys Leu
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Val Ala Gln Ala Asn Thr His Tyr Asp Glu Glu Gly Asn Ile Thr Asp
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Glu Thr Val Thr Val Arg Leu Lys Asp Gly Asp Ile Ala Met Val Gly
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Val Gly Thr Ala Met Ile Pro Phe Leu Glu His Asp Asp Ala Asn Arg
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Thr 660	Tyr Leu	Leu Arg	Lys Phe	Gln Arg	Thr 665
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Asn 675	Gln Lys	Pro Leu	Val Asn	Leu Gly	Glu Arg
					Val Val
					Glu Ala
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Val 690	Ile Ala	Asp Gly	Pro Gly	Thr Phe	Asn Gly
					Glu Met
					Ser Leu
					Gly 700
Arg 705	Asn Leu	Leu Val	Ala Phe	Met Pro	Trp Glu
					Gly His
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					Glu 720
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Thr 740	Ile His	Ile Glu	Glu His	Glu Ile	Asp Ala
					Arg Asp
					Thr Lys
					Leu 750
Gly 755	Ala Glu	Glu Ile	Thr Arg	Asp Ile	Pro Asn
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					Glu Glu
					Val 765
Leu 770	Lys Asp	Leu Asp	Asp Arg	Gly Ile	Val Arg
					Ile Gly
					Ala Asp
					Val 780
Arg 785	Asp Gly	Asp Ile	Leu Val	Gly Lys	Val Thr
					Pro Lys
					Gly Glu
					Thr 800
Glu 805	Leu Thr	Pro Glu	Glu Arg	Leu Leu	Arg Ala
					Ile Phe
					Gly Glu
					Lys 815
Ala 820	Arg Glu	Val Arg	Asp Thr	Ser Met	Lys Val
					Pro His
					Gly Glu
					Thr 830
Gly 835	Lys Val	Ile Gly	Val Arg	His Phe	Ser Arg
					Glu Asp
					Asp Asp
					Asp Asp
Leu 850	Ala Pro	Gly Val	Asn Glu	Met Ile	Arg Ile
					Tyr Val
					Ala Gln
					Lys 860

Arg Lys Ile Gln Asp Gly Asp Lys Leu Ala Gly Arg His Gly Asn Lys
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Gly Val Val Gly Lys Ile Leu Pro Gln Glu Asp Met Pro Phe Leu Pro
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Asp Gly Thr Pro Val Asp Ile Ile Leu Asn Thr His Gly Val Pro Arg
900 905 910

Arg Met Asn Ile Gly Gln Val Leu Glu Thr His Leu Gly Trp Leu Ala
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Ser Ala Gly Trp Ser Val Asp Pro Glu Asp Pro Glu Asn Ala Glu Leu
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Val Lys Thr Leu Pro Ala Asp Leu Leu Glu Val Pro Ala Gly Ser Leu
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Thr Ala Thr Pro Val Phe Asp Gly Ala Ser Asn Glu Glu Leu Ala Gly
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Ala Asp Gly Lys Ala Thr Leu Ile Asp Gly Arg Ser Gly Glu Pro Tyr
995 1000 1005

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His Leu Val Asp Glu Lys Ile His Ala Arg Ser Thr Gly Pro Tyr
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Arg His Asp Lys Ser Ala Lys Val Ala Thr Ala Ala Leu Lys Gly Ser
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Pro Gln Arg Arg Gly Val Cys Thr Arg Val Tyr Thr Thr Thr Pro Lys

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ggc atc gag gtt tcc gct tac atc cct ggt gag ggc cac aac ctg cag			724
Gly Ile Glu Val Ser Ala Tyr Ile Pro Gly Glu Gly His Asn Leu Gln			
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Glu His Ser Met Val Leu Val Arg Gly Gly Arg Val Lys Asp Leu Pro			
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Gly Val Arg Tyr Lys Ile Val Arg Gly Ala Leu Asp Thr Gln Gly Val			
95	100	105	
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Lys Asp Arg Lys Gln Ala Arg Ser Pro Leu Arg Arg Glu Glu Gly Ile			
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Ile Lys Asn Ala			
125			
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Val Cys Thr Arg Val Tyr Thr Thr Thr Pro Lys Lys Pro Asn Ser Ala
35 40 45

Leu Arg Lys Val Ala Arg Val Arg Leu Thr Ser Gly Ile Glu Val Ser
50 55 60

Ala Tyr Ile Pro Gly Glu Gly His Asn Leu Gln Glu His Ser Met Val
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Leu Val Arg Gly Gly Arg Val Lys Asp Leu Pro Gly Val Arg Tyr Lys
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Le Val Arg Gly Ala Leu Asp Thr Gln Gly Val Lys Asp Arg Lys Gln
100 105 110

Ala Arg Ser Pro Leu Arg Arg Glu Glu Gly Ile Ile Lys Asn Ala
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